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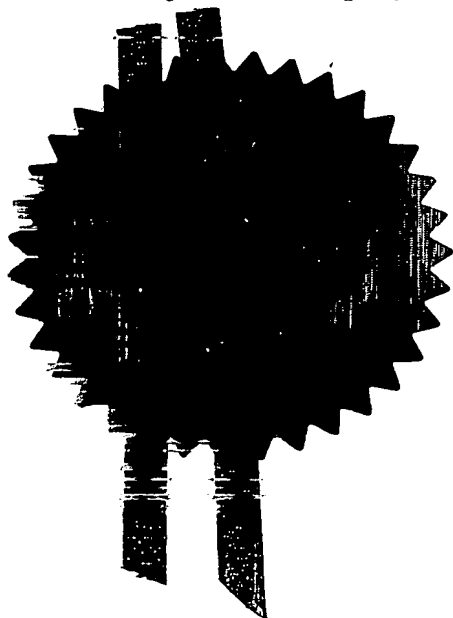
PCT

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

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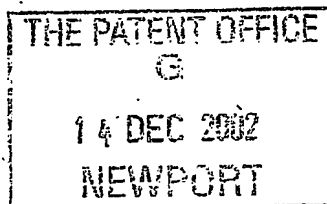


Signed

Dated 23 October 2003

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Patents Act 1977
(16)



Request for grant of a patent

(see notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
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1. Your reference

A2696

16DEC02 E771060-1 000115
P01/7700 0.00-0229169.8

2. Patent application number
(the Patent Office will fill in this part)

0229169.8

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Automotive Products Italia S.p.A
Via Montecarottese 2
60030 Doie Di Maiolati, Spontini
Ancona, Italy

Patents ADP number (if you know it)
If the applicant is a corporate body, give the country/state of its incorporation

Italy

8538027001

4. Title of the invention

Handbrake Strut with Snail Cam
Adjuster

5. Name of your agent (if you have one)

R Morrall

"Address for service" in the United Kingdom to which all correspondence should be sent

Automotive Products Group Ltd
Patent Department
PO Box 2085
Tachbrook Road
Leamington Spa
Warwickshire
CV31 3ZL

(including the postcode)

78193 11001

Patents ADP number (if you know it)

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications (if you know it) the or each application number

Country	Priority application number (if you know it)	Date of filing (day/month/year)
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7. If this application is divided or otherwise derived from an earlier UK application

Number of earlier application	Date of filing (day/month/year)
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body:
- See note (d)

YES

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Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description 4

Claim(s) 1

Abstract -

Drawings 2 + 2 *ll*

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and search (*Patents Form 9/77*) YES

Request for substantive examination (*Patents Form 10/77*)

Any other documents
(please specify)

11. I/We request the grant of a patent on the basis of this application
Signature *R. Morrall* Date *13/12/02*

R Morrall - Agent

12. Name and daytime telephone number of person to contact in the United Kingdom R Morrall 01926 473703

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- a) If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505
- b) Write your answers in capital letters using black ink or you may type them.
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- d) If you have answered 'Yes' Patent s Form 7/77 will need to be filed.
- e) Once you have filled in the form you must remember to sign and date it.
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DUPLICATE

A2696

PARKING BRAKES

This invention relates to parking brakes and in particular to parking brakes hereinafter referred to as of the type described which comprise a drum containing a pair of brake shoes, a handbrake lever pivoted adjacent one end on one of the shoes, and a strut extending between a first abutment on the handbrake lever and a second abutment on the other brake shoe so that pivoting of the handbrake lever relative to said one shoe moves the strut which in turn moves the other shoe away from said one shoe to bring the shoes into contact with the drum and thus apply the parking brake..

Parking brakes of the type described are well known and work efficiently particularly when they are actuated manually by a conventional driver operated lever. There is, however, an increasing requirement to provide parking brakes which are capable of electric motor application in order to dispense with the conventional manually operated lever.

One problem associated with electric motor actuated parking brakes is that the actuation system often has a relatively limited movement capability and this can therefore provide difficulties in ensuring efficient and sufficiently long lived actuation of the parking brake function when teamed with a parking brake of the type described which includes significant inherent lost motion in its actuation linkage.

In the applicants co-pending Application No GB 0221018.5 there is described a parking brake of the type described in which one of the abutments comprises a biased wedging means which acts on the strut to take up all play in the thrust path between the handbrake lever and the other brake shoe via the strut.

Such an arrangement can significantly reduce the lost motion in the parking brake actuating linkage due to manufacturing, assembly and adjustment clearances between the strut and the first and second abutments and can also compensate for wear (due, for example, to Brinelling) of these components resulting from the high loads imposed on these components.

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The previously referred to earlier co-pending application described in detail an arrangement in which the second abutment comprises a biased wedge one edge of which slides along a plate secured to the web of the other shoe, a further edge of the wedge sliding along a further abutment surface on the strut. Preferably the further abutment surface on the strut comprises the root of a forked end portion of the strut, the forked end having two prongs which extend on opposite sides of a web of the other brake shoe.

The Applicants have established that the biased wedging means could also take the form of a cam which is biased against one end of the strut and is mounted on the lever or other shoe.

Preferably the cam is a rotary or snail-cam which is rotational biased against said one end of the strut by torsion spring means.

Use of a rotary cam reduces the number of component parts of the wedging means and reduces the radially inward projection of the wedging means into the central wheel hub region of the brake. Also, the angle of contact between the strut and cam can be optimised to take up the clearances without the generation of high forces on the cam which might otherwise tend to move the cam and thus negate the clearance adjustment.

The ends of the brake shoes remote from the strut may pivot on a fixed reaction abutment or on a manual or automatic wear adjustment device positioned between the ends of the shoes. For example the automatic wear adjustment devices for a parking brake described in the Applicant's co-pending applications Nos 02 21019.3 and 02 23797.2 are particularly suitable.

One embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 shows a perspective view of the brake shoes and actuating mechanism of a parking brake in accordance with the present invention and

Figure 2 shows on a larger scale the biased cam-type wedging arrangement used in the parking brake of Figure 1, and

Figure 3 shows diagrammatically further details of the biased cam-type wedging arrangement.

Referring to the drawings this shows the shoe arrangement for a parking brake for use in a so-called drum in disc brake in which a pair of shoes 11 and 12 are mounted on a backplate (not shown) The upper ends of the shoes are pulled against a fixed backplate mounted abutment (not shown) or against a separate abutment on the adjacent vehicle suspension by a return spring 15 and the other ends of the shoes pivot on a wear adjustment device shown at 16 in figure 1. This wear adjustment device may be manually adjusted (as shown) or automatically adjusted as, for example, disclosed in the automatic parking brake adjustment device disclosed in the Applicant's co-pending patent applications numbers 02 21019.3 and 02 23797.2 referred to above.

The shoes are contained within a drum (not shown) and the shoes are arranged to be brought into contact with the drum by an actuating mechanism which comprises a handbrake lever 18 which is pivoted adjacent one end by pin 19 on brake shoe 11. A strut 20 which has forked ends 20a and 20b acts between a first abutment 18a on handbrake lever 18 and a second abutment associated with brake shoe 12 in the form of a snail-type rotary cam 22 which is pivotally mounted on shoe 12 at 24 and has an edge 22a which is rotationally biased into contact with the root 20c of forked end 20b of strut 20 by wire torsion spring 23.

It will be appreciated, any manufacturing, assembling or adjusting clearances which may be present between the abutment surface 18a on handbrake lever 18 and the co-operating root 20d of forked end 20a of strut 20 and between the root 20c and the edge 22a of cam 22 are automatically taken up due to the biasing effect of the rotary wire spring 23 so that there is no lost motion in the parking brake actuating mechanism. Thus all pivoting of the handbrake lever 18 relative to the brake shoe 11 by, for example, a cable 26 which is attached to the lower end 18c of handbrake lever results in immediate movement of the strut 20 and

the other brake shoe 12. Also any changes in the size of these contacting components during use of the brake (e.g. caused by Brinnelling due to the high loads imposed) will be taken-up by the biased cam 22.

As will be appreciated if the cable 26 is operated by an electric motor it is particularly important that all lost motion in the actuating mechanism should be eliminated and this is efficiently and cheaply carried out by the cam 22. It will also be noted that clearances between the strut 20, lever 18 and shoe 12 are multiplied by a factor of approximately 5 at the lower end 18c of lever 18 due to the lever ratio thus making their elimination even more important.

The cable 26 can be attached to the lower end 18c of handbrake lever 18 by any suitable arrangement. For example the pivoting latch arrangement disclosed in the Applicant's co-pending PCT application number WO98/40640.

As indicated above the wear adjustment device 16 (which adjusts the position of the brake shoes in order to compensate for the wear of the brake linings 11b and 12b of the shoes respectively) may either be a conventional screw-threaded manual adjustment device (as shown) which is operated through a hole in the backplate of the brake or could be an automatic adjustment device as, for example, described in the Applicant's co-pending applications numbers 02 21019.3 and 02 23797.2. Since this wear adjustment device forms no part of the present invention it will not therefore be described in detail and if details of a suitable adjustment device are required reference should be made to the above referred to co-pending patent application.

CLAIMS

1. A parking brake of the type described in which a biased wedging means acts on the strut to take up all play in the thrust path between the handbrake lever and the other brake shoe via the strut.
2. A parking brake according to claim 1 in which the biased wedging means comprises a cam which is biased against one end of the strut and is mounted on the lever or other shoes.
3. A parking brake according to claim 2 in which the cam is a rotary cam biased against said one end of the strut by torsion spring means.
4. A parking brake of the type described constructed and arranged substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

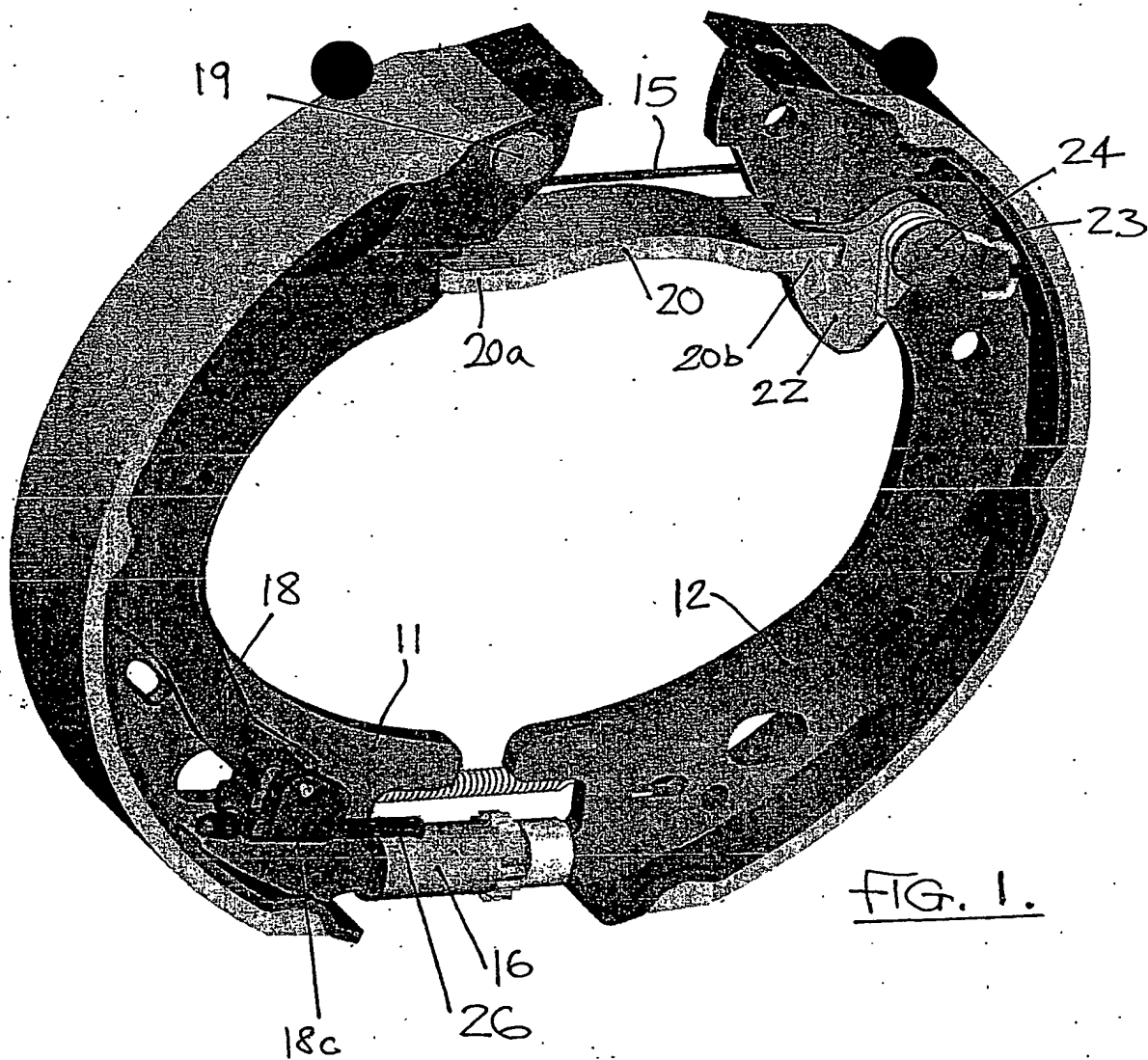


FIG. 1.

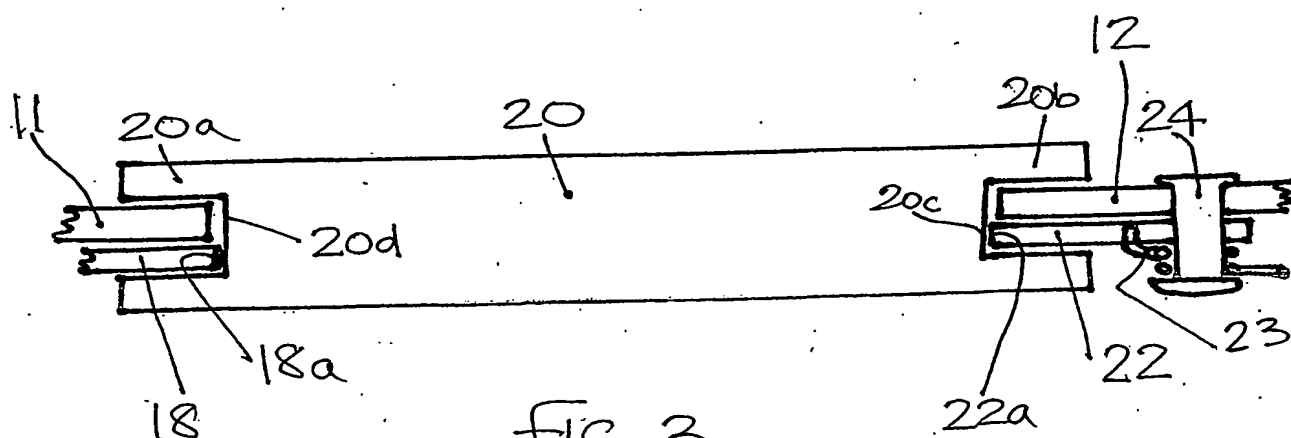


FIG. 3.

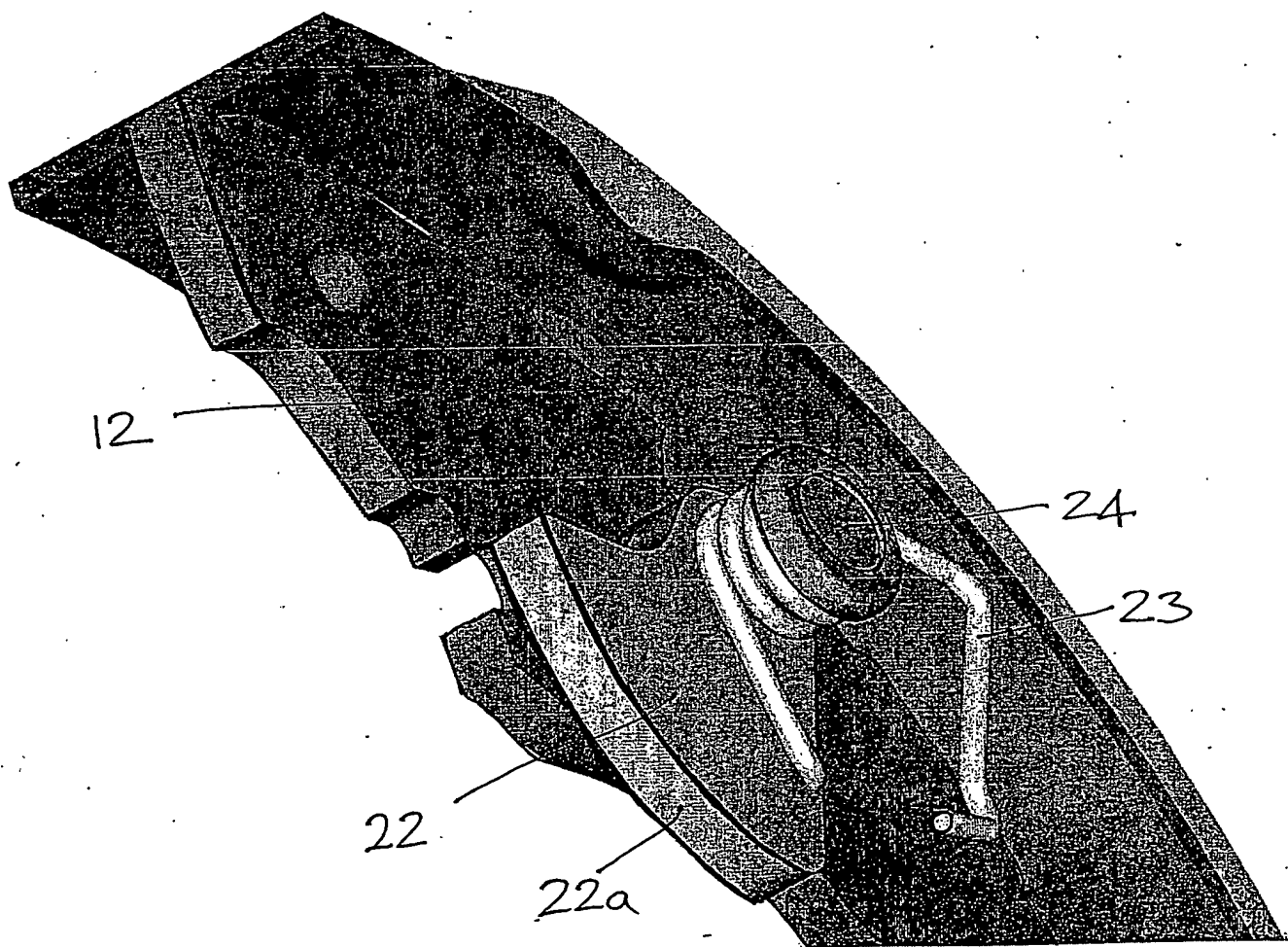


FIG. 2.